

published by Maebeth, Preece and Winzor (1935) for hydroxydroserone. A small crest on the curve drawn by these authors at approximately 535 millimiera is seen visually as a distinct and characteristic narrow band. This and its companion at approximately 520 millimiera (Maebeth, Preece and Winzor—518 millimiera) shift slightly to the red in light petroleum.

Two other crystalline substances believed to be droserone and plumbagin have been isolated from some of the plant material studied and the existence of a fourth is indicated by filter paper chromatography. It is hoped to make these the subject of a further paper.

I wish to acknowledge the gift of *D. Whittakeri* tubers kindly forwarded to me by Mr. T. R. N. Lothian, Director of the Botanic Garden, Adelaide, and of helpful correspondence from Mr. R. G. Cooke, Chemistry Department, University of Melbourne.

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THE INTRODUCED TURTLEDOVES IN WESTERN AUSTRALIA

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(Continued from p. 100)

PART II

From the numerous metropolitan records received it has been deduced that both the Senegal Turtle dove (*Streptopelia senegalensis*) and the Indian Turtle dove (*S. chinensis*) extend virtually throughout the built-up areas of Perth.

In the list of localities which follows, the distinction between "metropolitan" and "extra metropolitan" areas has not been made on an arbitrary geographical basis; the author has classed as "metropolitan" areas which are substantially built up and "extra metropolitan," not only country centres but also areas only partly built up which fall within the metropolitan area proper.

A few negative records of the Senegal Turtle dove from well outside the known distribution of the species in Western Australia have been excluded and negative records of the Indian Turtle dove have been given only for localities from which the Senegal Turtle dove has been recorded.

THE EXTRA METROPOLITAN DISTRIBUTION OF THE
TURTLEDOVES

ARMADALE. Senegal: Recorded by E.H.S. in August, 1955, and in December, 1955, in both cases near the Narrogin Inn. B.V.T. was unable to locate either of the turtledoves on March 29, 1957, but on April 1, 1957, when two hours were spent in the vicinity, an unidentified *Streptopelia* was heard cooing near the Railway Station.

Indian: Recorded in *Birds of W.A.*, both 1948 and 1951 editions. Two individuals were recorded by D.L.S. on Nov. 20, 1945, at the Old Narrogin Inn, two by G.M.S. on June 3, 1953, and two by D.L.S. two miles south, on the Albany Highway.

BAANDEE. Senegal: B.V.T. observed three birds at a homestead on September 14, 1954, and D.L.S. one bird on June 20, 1957. Silo established 1933.

BAKERS HILL. Senegal: Two individuals were recorded by G.M.S. on December 1, 1953, and four by B.V.T. on November 17, 1955, B.V.T. also observed one bird at the 49-mile peg, W.A.G.R., between Bakers Hill and Claekline.

BALDIVIS (Peel Estate). Senegal: Not recorded by E.H.S., 1937-1940.

Indian: On February 6, 1938, the day following a severe bush fire, one bird appeared near the Baldivis School and during November, 1940, calls were heard and one bird seen. A bird was seen feeding near White Lake, e. 2 miles to the west, on May 30, 1937 (E.H.S.).

BEACON. Senegal: One bird seen by D.N.C. early in 1952, and three on February 3, 1956.

Indian: Not recorded.

A bulkhead was established in 1944.

BEDFORDALE. Indian: Two individuals recorded by G.M.S. near the 20-mile peg on the Albany Highway on June 12, 1954.

BEVERLEY. Senegal: Recorded in *Birds of W.A.*, both in 1948 and 1951 editions. B.V.T. found the species established when he first visited the town in 1947 (about which time it was also observed by C.F.H.J.). On November 26, 1952, several were noticed round the bulk wheat bin in the rail siding. Delivery and loading of wheat were in full swing, there being a queue of about a dozen trucks. Two of the doves were foraging under a large semi-trailer which was in the process of being loaded. The birds were quite unperturbed by the roar and vibration of the elevator engine and general activity accompanying the loading of grain.

On May 30, 1953, approximately 12 were seen in mistletoe-infested Jam (*Acaea acuminata*), some of which were dead on the combined road and rail reserve two miles north of Beverley. Two were seen, in dry *Ac. acuminata*, on the railway reserve two miles south of Beverley on July 16, 1954.

D.L.S. noted two birds on Feb. 14, 1952.

On December 29, 1955, E.H.S. and L.E.S. recorded two birds on the Highway on the southern outskirts of the town, and one bird

four miles south of the town flew from the Highway to adjacent wandoo forest.

Silo established in 1936.

BIBRA LAKE. Indian: B.V.T. observed three at a homestead on January 27, 1957.

BICKLEY. Senegal: Presence reported to D.L.S.⁶ by Mr. W. H. Loaring on May 20, 1952.

Indian: Reordered in *Birds of W.A.*, both 1948 and 1951 editions.

BICKLEY RESERVOIR. Senegal: Reordered at Gould League camps, 1953 and later, by several observers including V.N.S. and E.H.S., but has not been frequent there.

Indian: Observed by a Gould League party in 1951, E.H.S. being present. This species also has never been frequent, and two seen on June 17, 1956, were the first seen for some time.

BLACKBOY HILL. Senegal: Reordered by G.M.S. on Dec. 1, 1953.

BOULDER. Senegal: See Kalgoorlie.

Indian: E.H.S. received reliable reports of birds at Boulder from 1945 onwards.

BOLGART. Senegal: Reordered in a reply to a Gould League questionnaire, 1955.

In reply to a request for further information, Mrs. R. Erickson wrote: "Dr. Serventy confirmed the presence of these birds at Bolgart some years ago when he visited this district. The first pair was seen in the same year as our bulk bins were established . . . 1939 . . . They did not increase for some years, but I recall that there were about three pairs about five years ago. What the present population is, I cannot say."

D.L.S. observed e. 10 doves in pepper-trees on July 9, 1951, and four doves in the town on June 13, 1957.

BROOKTON. Senegal: B.V.T. found the species established when he first visited the town in 1947. V.F.MeD. noted two birds while travelling through the town by train on June 19, 1957. Silo established in 1936.

BULLSBROOK. Senegal: D.L.S. reordered one on the main Geraldton Road four miles to the south of Bullsbrook on Oct. 2, 1951, and noted four birds one mile south of the R.A.A.F. Station on May 16, 1953.

Geo. Winnett and E.H.S. frequently observed two doves, but only two, at the R.A.A.F. Station between Aug. 28 and Sept. 6, 1955.

Indian: Not reordered.

BUNBURY. Senegal: G.M.S. noted five individuals in the port area on April 6, 1953.

Fifteen months earlier E.H.S. observed turtledoves near the High School and near the Post Office, but could not identify them to his satisfaction. In January, 1955, he saw three birds near the Railway Station, one very plainly. This was a Senegal Turtledove. Later in the day a dove was heard near the mouth of the Estuary.

Doves were still present in March, 1956. In April, 1956, seven birds were seen at one time near the Fire Station. (This area appears to be the main stronghold of the Bunbury population.) On the same day one bird was seen in Forrest Avenue near Forrest Park.

Indian: The only known record is one of a single bird seen by C.F.H.J. in mangroves at Rathmines in February, 1955.

BUNGULLA. Senegal: D.L.S. observed two birds opposite the wheat bin on June 20, 1957.

Silo established in 1933.

BURGES SIDING. Senegal: On January 6, 1956, B.V.T. saw four birds at a homestead where many trees including Pepper-trees (*Schinus molle*) were growing.

Silo established in 1939.

BURNBRAE (near Byford). Senegal: Recorded in reply to a Gould League questionnaire.

Indian: Recorded in reply to a Gould League questionnaire.

BUSSELTON. Indian: Recorded in *Birds of W.A.*, both 1948 and 1951 editions. However, G.M.S. saw none at Busselton in early 1954 (vide *W.A. Nat.*, 4: 142) and E.H.S. saw none during brief visits in January, 1955. See note on Quindalup, 9 miles west of Busselton.

CHIDLOWS. Senegal and Indian: E.H.S. noted turtledoves in 1951 and provisionally identified them as Senegal Turtledoves. However, G.M.S. recorded the Indian Turtledove in this area on Dec. 1, 1954.

COLLIE. Senegal: B.V.T. visited this centre occasionally from 1946 until 1956. A brief search of the railyard and main streets on July 14, 1954, proved fruitless.

The species was not recorded by E.H.S., residing in Collie during 1956 and 1957, until July 10, 1957, when he saw one bird in the railyard. On Sept. 18 calls were heard near the High School, probably from the large pines nearby.

COOGEE. Senegal: Recorded by G.M.S. on June 7, 1953.

COOKERNUP. Indian: Recorded in *Birds of W.A.*, 1951 ed. only.

CORRIGIN. Senegal: E.H.S., while residing at Bilbarin in 1946, visited Corrigin on a few occasions but did not record the species.

B.V.T. had the town under sporadic observation from 1947 until mid-1956. A day of concentrated observing on August 17, 1953, failed to reveal this species and a further search on August 21 also proved futile. He first recorded the species on January 27, 1954, two being seen in the trees in the main street north of the Post Office and adjacent to the railway barracks and wheat bins. This is also the marginal area between the town and bordering scrub land. Later on the same day, in the same area, three individuals perched on a dry *Acacia* were observed at close quarters. On March 15, 1954, one was seen in ornamental eucalypts between the hotel and railway station, and on March 18 four were noted in street trees and natural bush near the Post Office. An individual was seen at the Hospital on April

4, 1954, and two were noted in the town on November 26, 1955. During his last visit to the town B.V.T. noted approximately ten birds in the street in the semi-bushland round the wheat bins.

J.W. (*in litt.*, 1956) wrote "R. Dear of Darlington advises me that *senegalensis* arrived in Corrigin about 1953 and that the first pair hatched three young." He had himself noted the species in Corrigin.

Silo established in 1933.

CUBALLING. Senegal: V.F.MeD. noted one bird while travelling through the town by train on June 19, 1957.

Silo established 1952.

CULHAM. Senegal: D.L.S. noted two birds on June 13, 1957.

CUNDERDIN. Senegal: D.L.S. noted individuals in a pepper-tree on July 1, 1952, one bird on Sept. 9, 1952, and two three miles to the east on August 10, 1952.

G.M.S. recorded three individuals on March 20, 1953, and found the species plentiful on December 2, 1953. He reports that the species had been there for several years, but he was unable to find out when they had first arrived. E.H.S., observing from a train, noted turtledoves at Cunderdin in 1943, but provisionally identified them as Indian Turtledoves. In the light of the later records it appears likely that these were Senegal Turtledoves. B.V.T. noted three birds in the town and one by a roadside three miles to the east on September 14, 1954.

DANGIN. Senegal: Recorded by E.H.S. on April 25, 1945. A party was observed by L.E.S. on January 28, 1951, feeding under a pepper-tree (*Schinus molle*) (*W.A. Nat.*, 2: 195). However, in January and February, 1954, he found that the colony had declined and that during two months spent in the district he saw only two individuals near some abandoned buildings on the outskirts of the town (*W.A. Nat.*, 4: 96). In January, 1955, E.H.S. saw one bird opposite the Co-operative Store, and again in September, 1956, saw only one bird in the course of several visits.

The decline of Dangin, as a town, has been very rapid during the past ten years.

* **Indian:** Not recorded.

Silo established in 1933.

DONGARA. Senegal: A reply to the Gould League questionnaire records that the species appeared many years ago and estimates a population in excess of fifty.

D.L.S. saw one bird in a Moreton Bay Fig on November 14, 1944, and noted two birds on June 8, 1957.

Indian: Recorded in reply to the Gould League questionnaire.

DOODLAKINE. Senegal: Turtledoves, species uncertain, recorded in reply to the Gould League questionnaire. Numbers believed to be increasing.

B.V.T. noted five Senegal Turtledoves on September 14, 1954.

Silo established in 1933.

EAST ROCKINGHAM. Indian: On January 7, 1938, E.H.S. noted these birds as being "fairly common as far south (of Perth) as East Rockingham."

ESPERANCE. Senegal: Recorded by L.E.S. on June 19, 1955, at a farm near Bandy Creek and about three miles north-east of the township. The species was not recorded by E.H.S. and L.E.S. in 1949-50 (*W.A. Nat.*, 2: 111), nor by V.N.S. in 1950-51 (*W.A. Nat.*, 3: 95).

Indian: Not recorded.

GARDEN ISLAND. Senegal: Recorded in *Birds of W.A.*, both 1948 and 1951 editions. W. B. Alexander (*Emu*, 20: 155) notes that "In January, 1920, one reached Garden Island, having doubtless been blown there by strong easterly winds." D.L.S. (*Emu*, 37: 268) records that "the species has not become established so far as it has on Rottnest." On Jan. 16, 1940, E.H.S. recorded the species as very plentiful at the Careening Bay settlement, outnumbering the Indian Turtledove. Ken Buller recorded the species in November, 1948, "in considerable numbers."

Indian: Recorded in *Birds of W.A.*, both 1948 and 1951 editions.

D.L.S. (*Emu*, 37: 268) notes "I saw several on May 26, 1937, and the species may become established." On January 27, 1939, E.H.S. recorded a number of these birds about the Careening Bay settlement. Ken Buller recorded the species in November, 1948, "in considerable numbers." D.N.C. noted four in 1953 (*W.A. Nat.*, 4: 20).

GERALDTON. Senegal: Recorded in *Birds of W.A.*, both 1948 and 1951 editions.

D.L.S. reports having seen Senegal Turtledoves three miles north of Geraldton on Aug. 16, 1943, and again on November 14 and 18, 1944. On Nov. 4, 1951, while on a motor run south from Northampton he first observed doves two miles north of Geraldton. Others were noted until seven miles south on the road to Dongara. Senegal Turtledoves were again seen on the road towards Northampton on Aug. 7, 1954, as far as six miles north of Geraldton. On the return trip on Aug. 10 they were seen from two miles north of Geraldton until two miles south. During another journey, made on June 8, 1957, he, with Mr. A. Robinson, saw one bird eight miles south of the town; three, six miles south; one, two miles south; 16, one mile south; three, two miles north; one, three miles north; one, four miles north; and on June 11, one, two miles north of the town and one, one mile east along the Mullewa road.

GIDGEGANNUP. Indian: D.L.S. noted one bird on the Toodyay Road, four miles west of Bailup Mill, on Aug. 3, 1953, and one bird on the Toodyay Road nine miles from the turn-off from the Geraldton Road, May 21, 1957.

GILGERING. Senegal: B.V.T. noted two birds on November 26, 1952, April 7, 1953, and on April 17, 1953. On the last-mentioned date two other individuals were seen on the railway line between Dale Bridge and Edwards Crossing south of Gilgering. One was

noted at Gilgering on May 30, 1953, and finally one on July 5, 1953, when wheat was being loaded into the bin. This siding was frequently visited from 1947 until mid-1955.

Silo established in 1939.

GLEN FORREST. Senegal: Noted by G.M.S. on December 28, 1952.

GNOWANGERUP. Senegal: D.L.S. noted one bird on Oct. 30, 1954.

Silo established in 1940.

GOLDEN RIDGE. Senegal: P.S. (*in litt.*) observes: "The Senegal Turtledove has spread to Golden Ridge, where I saw several birds from September, 1953."

Indian: Not recorded.

GOOMALLING. Senegal: Reecorded by L.E.S. on December 21, 1951: "... a party of eight . . . feeding in the railway yard. Further investigation showed that the birds had established a strong colony in the township" (*W.A. Nat.*, 3: 116).

D.N.C. records that he has seen two or three birds from time to time.

Indian: Not reecorded.

Silo established in 1938.

GOSNELLS. Senegal: D.L.S. noted one bird on Nov. 14, 1945.

Indian: Reecorded by G.M.S. on April 19, 1953.

GRASS VALLEY. Senegal: D.L.S. saw one bird, one mile east, on Aug. 10, 1952.

GREENHILLS. Senegal: D.L.S. observed four birds, two miles west of Greenhills, on Aug. 11, 1953.

Silo established in 1936.

HARVEY. Senegal: Recorded in *Birds of W.A.*, both 1948 and 1951 editions.

HARVEY ESTUARY (five miles S. of Mandurah). **Senegal:** J.W. records this species in the scrub near Harvey Estuary.

HERNE HILL. Senegal: D.L.S. reecorded this species on April 13, 1953.

HINES HILL. Senegal: D.L.S. noted one bird on June 20, 1957. Silo established 1939.

HOPELANDS (near Serpentine). **Senegal:** A reply to the Gould League questionnaire records that the species has been present for several years.

Indian: Not recorded.

JANDAKOT. Senegal: G.M.S. recorded a Turtledove (sp.) on April 3, 1953, and one Senegal Turtledove on July 7, 1953.

On April 3, 1957, B.V.T. saw two on the railroad in virgin sand-p'lain country four miles east of Jandakot, also one near large pines at houses one mile east of this eentre and three birds at the railway station.

JARRAHDALÉ. **Senegal:** D.L.S. noted one bird on Oct. 8, 1950.

JENNACUBBINE. **Senegal:** Recorded by L.E.S.—one bird on December 26, 1951 (*W.A. Nat.*, 3: 117).

Indian: Not recorded.

Silo established in 1939.

KALGORLIE. **Senegal** and **Indian:** Recorded in *Birds of W.A.*, 1951 edition only.

W. R. Wheeler made a single record of the species in 1948 (*vide* Tarr, *Emu*, 49: 191).

P.S. (*in litt.*) states: "Both the Senegal and Indian Turtledoves occur in Kalgoorlie-Boulder. In 1949 the Indian was by far the commoner, but by 1954 the Senegal outnumbered the Indian. None I asked recalled having seen the Senegal before 1949." Association is generally with the introduced *Schinus molle*.

Enquiries by E.H.S. in 1951 were inconclusive but gave the impression that the Senegal Turtledove was the older established species and that it had been present for some years.

In June, 1957, D.L.S. spent two and one half days in this area and saw one Senegal Turtledove on telephones wires at Lamington. Though he examined the streets of both Kalgoorlie and Boulder and visited Victoria Park (where E.H.S. had found doves conspicuous in 1950) he saw no other doves. He adds: "It was chilly and may have been unsuitable dove weather, but the whole Kalgoorlie environment appeared to me unfavourable to doves."

KARPING. **Senegal:** B.V.T. observed one on November 12, 1952. Though this siding was visited many times from 1947 until 1956 the above is the sole record. There is no wheat silo at Karping.

KATANNING. **Indian** and **Senegal:** Visited frequently by B.V.T. from 1947 to 1956. He devoted the afternoon of March 26, 1953, to an unsuccessful search of several well-treed streets and other likely localities, including railyards and the vicinity of the flour mills.

G.M.S. failed to locate either species in June, 1953.

Mr. A. Kalnins writes (1957), "the Indian Turtledove was noticed in Katanning about three years ago—several pairs have been living here since," and adds that he has noticed them nesting and feeding not only in the township but also at several homesteads in the district.

V.F.McD. writing of the Senegal Turtledove states: "I had reports about eighteen months ago of their being in Katanning. I also had a report, on good authority, that some were released there many years ago." However, the writer had not seen the species himself—Oct. 14, 1957.

P.S. (Oct. 12, 1957) advised that he had recently seen both species of turtledove in Katanning.

KELLERBERRIN. **Senegal:** Recorded by Ford and Stone ("Birds of Kellerberrin and Kwoylin," *Emu*, 57: 9).

Mr. P. Stone has made available additional information. Kellerberrin townsite was already colonised when he moved there in 1951. The approximate population at present is 50-60 pairs. He does

not know whether doves are present at Kwolyin or Shaekleton townsites at present, but he thinks that he has seen them at Shaekleton. Many farm settlements have been colonised with from one to three pairs of doves. At his own farm, three miles east of Kellerberrin, there are at present three birds. Doves arrived at another property, six miles north of Kwolyin, in 1949.

D.L.S. noted one bird, two miles east, on Aug. 10, 1952, and two birds at Kellerberrin on June 20, 1957.

Silos were established at Kwolyin and at Shaekleton in 1933.

KELMSCOTT. Senegal: G.M.S. and D.L.S. reeorded an individual on June 3, 1955.

Indian: On the same day D.L.S. reeorded two Indian Turtle-doves, two miles to the south of Kelmseott.

KURRAWANG. Indian: Reeorded by P.S.

KWEDA. Senegal: Reeorded in reply to the Gould League questionnaire.

Indian: Not reeorded.

Silo was established in 1939.

KWINANA. Senegal: Reeorded by G.M.S. on April 4, 1953.

MANDURAH. Senegal: G.M.S. failed to locate this species in April, 1953.

Indian: D.L.S. reeorded a bird on the south side of the Causeway on Mareh 9, 1944, and one nine miles south, on the Coast Road, on July 16, 1950.

MECKERING. Senegal: Reported to G.M.S. as being present in December, 1953.

MACKIES SIDING. Senegal: B.V.T. noted two on November 17, 1955, at which time the wheat bin was not in use. He had had the siding under observation from 1947.

MERREDIN. Senegal: E.H.S. records: "In May, 1952, birds were seen plainly at the R.A.A.F. Depot and turtledoves were heard near the railway station. In January, 1953, the position appeared to be unchanged."

D.L.S. saw one bird on Aug. 10, 1952.

B.V.T. noted six at the flour mill on Mareh 24, 1954, and a further six in Todd Street and the Great Eastern Highway. He considered the species less abundant than it was at Narrogin at that time.

On June 20, 1957, D.L.S. saw five birds two miles to the west of Merredin and, on the following day, ten birds on telephone wires opposite one of the town hotels.

Silo established 1939.

MIDDLE SWAN. Senegal: Noted by L.E.S. about two miles north of Midland Junction.

MILLENDEN. Indian: D.L.S. noted one bird on May 8, 1953.

MOORA. Senegal: Reeorded in reply to the Gould League questionnaire.

Mr. C. L. E. Orton, confirming this, states that the doves are still present, though in decreased numbers since a severe storm in February 1957. The birds prefer the township and suburbs, and two years ago a pair nested in the main street.

Silo established 1938.

MUNDARING. Indian: One turtledove, almost certainly this species, just east of the townsite on February 6, 1957—E.H.S.

MURESK. Senegal: Recorded in *Birds of W.A.*, both 1948 and 1951 editions.

D.L.S. recorded doves at the Agricultural College on Feb. 14, 1952.

NARROGIN. Senegal: B.V.T. records that the species was present when he took up residence in Narrogin in 1947 and that it is now one of the town's commonest birds. At 1600 hours on June 5, 1954, during a sunny break in a wintry sky, he saw an estimated 40 birds concentrated in two jam trees (*Acacia acuminata*) on the edge of the rail marshalling yards. Many others were present in adjacent flooded gums (*Eucalyptus rudis*). On June 14, 1954, a juvenile barely capable of flight was observed near the Town Hall. There is a nesting record for February, 1954. The species increased rather noticeably during the period 1953-54.

Two birds were noted by D.L.S. on June 12 and four on June 13, 1954.

V.F.MeD. noted 20+ birds while travelling through the town by train on June 19, 1957.

NATIONAL PARK. Senegal: Recorded in *Birds of W.A.*, in both 1948 and 1951 editions.

NORTHAM. Senegal: Recorded in *Birds of W.A.*, both 1948 and 1951 editions.

C.F.H.J. (*Emu*, 31, 1931: 30) states: . . . "occasionally seen in the district, probably having made its way from Perth where it is exceedingly common."

Noted by E.H.S. in August, 1933, and on October 15, 1941.

L.E.S. recorded the species as "quite common" on Jan. 5, 1949.

D.L.S. noted doves one mile east and one mile west on Aug. 10, 1952.

B.V.T. noted two when passing through the town on September 14, 1954, and one on a similar trip on November 13, 1954.

G.M.S. noted the species on January 19, 1955.

E.H.S. considers the species considerably more abundant in Northam than is indicated by these actual records.

Indian: Not recorded.

PARKERVILLE. G.M.S. recorded two turtledoves (sp?) on December 1, 1953.

PARKESTON. Senegal and Indian: P.S. (*in litt.* July 1955) notes: "Both doves occur at Parkeston."

PINGELLY. Senegal: B.V.T. found the species established when he first visited the town in 1947. V.F.MeD. noted 3+ birds while

travelling through the town by train on June 19, 1957. Silo established 1936.

PINJARRA. E.H.S. heard calls of a turtledove, probably the Indian, near the Post Office on October 12, 1957.

POPANYINNING. Senegal: B.V.T. had this locality under observation from 1947 to 1956 and observed one bird on January 14, 1954.

QUAIRADING. Senegal: In January, 1954, L.E.S. reeorded the species as "eommon and onsipueous . . . reported to have occurred there for at least five years (*W.A. Nat.*, 4: 96).

In January, 1955, E.H.S. found the position unehanged.

Indian: Not reeorded.

Silo established 1933.

QUALEN. Senegal: B.V.T. reeorded a small party on January 13, 1953, two birds on April 17, 1953, two half a mile north of the siding on April 22, 1953, and one on January 14, 1954. This siding at which there is no wheat silo was under observation from 1947 until 1955.

QUINDALUP. Indian: One bird was reeorded by G.M.S. on February 20, 1953, who adds, "I had only a glimpse of the bird and the reeord needs confirming" (*W.A. Nat.*, 4: 142). L.E.S. observed a dove (species not identified) near a farmhouse behind the beach on February 3, 1958.

ROCKINGHAM. Senegal: Reeorded by E.H.S. in January, 1940, as outnumbering the Indian Turtledove.

Indian: Reeorded in *Birds of W.A.*, both 1948 and 1951 editions.

Reeorded by G.M.S. on April 4, 1953, and on September 16, 1953.

ROTTNEST ISLAND. Senegal: Reeorded in *Birds of W.A.*, both 1948 and 1951 editions.

A. G. Kilpatriek (*Emu*, 32, 1932: 31) reeords the Turtledove, species unspecified, as "very eommon." Presumably these birds would have been the Senegal Turtledove—see note on Indian Turtledove on Rottnest.

D.L.S. (*Emu*, 38: 266) states ". . . Rottnest was free of them until about the summer of 1930-31, since when the species is firmly established in the eastern (settled) portion of the island."

In January, 1947, D.L.S. noted a bird near Mt. Herschell, one near the Settlement, one near Serpentine Lake and one near Point Clune. On April 30, 1955, he saw several doves near the Lighthouse.

G.M.S. noted the species on January 26, 1953, and February, 1955, when they were eommon exept on the western end.

Indian: Reeorded in *Birds of W.A.*, both 1948 and 1951 editions.

D.L.S. (*Emu*, 37: 266), discussing the Senegal Turtledove, reeords that "Aceording to observations by Mr. C. Sporn of the Government School, Rottnest, the Indian Turtledove appears also to oeure there (i.e., Rottnest) now (i.e., 1938)."

In Jan. 1947, D.L.S. reeorded two birds near the Settlement, one near the Salt Works and one near the Bungalow, adding that

"it is a less common species than the Senegal Turtledove." On April 30, 1955, he saw one bird near the Lighthouse.

SAFETY BAY. Senegal: E.H.S. noted Senegal Turtledoves on the townsite and among the sandhills on January 11, 1947.

Recorded by G.M.S. on April 4, 1953.

SEABROOK. Senegal: J.W. (*in litt.*) quotes R. Dear of Darlingten as having first noted the species at Seabrook in 1956.

SOUTH CAROLING. Senegal: D.L.S. observed two birds on August 11, 1953.

SPEARWOOD. Senegal: Recorded by the railway siding by E.H.S. on August 27, 1938. B.V.T. recorded two on October 16, 1955, and eight at the Railway Station on April 3, 1957.

SPENCERS BROOK. Senegal: B.V.T. recorded two birds on November 17, 1955.

SWAN VIEW. Senegal: B.V.T. observed approximately 20 doves foraging in the railyard on May 8, 1956. Heavy rail movements of bulk wheat were in progress at this period.

TAMBELLUP. Senegal: Extracts from letters written to the Chief Inspector of Fisheries by F. J. Potter of Tambellup read as follows:—

Nov. 12, 1946: ". . . there are no doves at Katanning, Tambellup or Gnowangeirup. They have not got so far south."

Jan. 29, 1949: "On November 5, 1948, I noticed a dove in my backyard and I fed same with some breadcrumbs. Then it disappeared. Yesterday it was in the yard again. I thought you would be interested as this is the only time I have seen doves down this way. It was one of the small variety you have in Perth with strawberry markings on the throat."

Feb. 10, 1949: "The bird seems to be making himself quite at home in the pines. I see him several times a day now, and he definitely answers the description of the Senegal Dove, being all you say—blue grey and pale purple; there are definitely no black spots on him."

TAMMIN. Senegal: D.L.S. noted one bird three miles to the west on Sept. 1, 1956.

Silo established 1933.

TOODYAY and District. Senegal: Recorded in *Birds of W.A.*, both 1948 and 1951 editions.

D.L.S. saw one bird on Sept. 20, 1946, and on July 9, 1951, noted a dove in a pepper-tree at the railway station.

On June 13 and again on July 7, 1957, on the Toodyay Road, ten miles west of Toodyay, he saw one Senegal Turtledove in the bush opposite a farm.

Silo established 1952.

UPPER SWAN. Senegal: D.L.S. recorded one bird on the Highway near the 21-mile peg on Oct. 8, 1951, and two birds near the Upper Swan Bridge on Sept. 5, 1953.

WAGIN. Senegal: B.V.T. first visited this town in 1944 and from 1947 until 1956 had it under frequent observation. He first reeorded the species on Mareh 26, 1953, when two were seen in the rail mar-shalling yards. The bird has been present in moderate numbers since that date but has not yet, apparently, spread east along the Lake Grace route.

G.M.S. reeorded the species on June 13, 1953, and D.L.S. one bird on June 13, 1954, and one bird on Sept. 17, 1956. V.F.McD. noted two birds while travelling through the town by train on June 19, 1957, and mentions Mr. R. Aitken as having reported turtle-doves (sp.?) at Lake Coomelberrup.

WATHEROO. Senegal: Two reeorded in the town by G.M.S. on July 24, 1953.

WELLARD. Indian: On August 15, 1938, E.H.S. noted a pair of these birds.

WICKEPIN. Senegal: B.V.T. had this town under observation from 1947 until 1956. His first reeord was of one bird in pines at the Railway Station on Mareh 18, 1954, and one was heard calling in the same locality on the following day. Three were seen on November 26, 1955, and ten noted in semi-bush near the Police and Rail-way Stations on July 18, 1956.

On December 3, 1955, E.H.S. reeorded doves ealling near the Wiekepin School and one Senegal Turtle dove was seen on overhead wires on the western outskirts of the town.

Indian: Not reeorded.

Silo established 1937.

WILLIAMS. Senegal: E.H.S., resident in Williams during 1954 and 1955, first reeorded the species there on January 16, 1955—one bird on the overhead wires near the Hospital. A second bird was seen later. These made the pine trees which were then growing in the hospital grounds their headquarters, then for a short time frequented a group of pines behind the school and finally in September, 1955, transferred to the pine grove at the Reereation Grounds. A reliable report indieates that a fourth pine grove was frequented for a short time. In December, 1955, he was told that the number of doves had increased to five but had no opportunity of confirming this.

B.V.T. knew this town intimately from 1942 until 1954 but did not reeord either of the turtledoves despite two days of intense observation in November, 1953.

Indian: Not reeorded.

Silo established 1953.

WINCHESTER. Senegal and Indian: Mr. John Lawson, Jr., in response to an artiele sponsored by the Fauna Proteetion Advisory Committee, wrote to the Chief Inspeetor of Fisheries on November 12, 1946, as follows: "With referenee to your artiele in the *West Australian*, Oetober 26, re Kookaburras and Doves, I should like to state that for the last three weeks I have noticed strange birds on our property and from your description they seem to be the

Indian Dove. For the first few days there were three such birds, but since then only two. I see them regularly in the same paddock almost daily, as I go to and from work. Our property is situated 6 miles north-east of Winchester on the Midland line. Last year for some weeks we used to see daily two strange dove-like birds—blue grey and pale purple. We never found out what they were—possibly the Senegal species you mentioned. They seemed rather tame—quite often around by the homestead, on the lawn or in the paddock nearby.”

WONGAN HILLS. Senegal: Recorded in *Birds of W.A.*, both 1948 and 1951 editions.

E.H.S. recorded an individual on October 11, 1941. There may have been more than one bird, but the species was not plentiful. Silo established 1933.

WOOLUNDRA. Senegal: D.L.S. noted one bird on Aug. 10, 1952. Silo established 1936.

WOOROLOO. Senegal: During 1951 and 1952 E.H.S. noted these birds from time to time and handled one dead bird which had struck a train. He gained an impression of a drifting population, but two birds may have been resident near the Post Office. At no time did he see more than two birds at the same time.

Indian: E.H.S. noted Indian Turtledoves sporadically, usually singly, during 1951, 1952 and 1953. A dead bird was handled in 1951. On one occasion three birds were located in creekside trees. None appeared to be resident.

WYALKATCHEM. Senegal: D.N.C. observed single birds while passing through this centre in 1949 and 1950. Silo established 1936.

YARLOOP. Indian: Recorded in *Birds of W.A.*, both 1948 and 1951 editions.

YEALERING. Senegal: B.V.T. had this area under observation from 1947 until 1956. His first record was an individual seen on May 1, 1953, and this was the first occasion upon which he had encountered the species east of Narrogin. More birds were located on May 28, 1953, one on August 18, 1953, and one on November 26, 1955. Silo established 1937.

YORK. Senegal: B.V.T. found this species established when he first visited York in 1947.

D.L.S. observed two birds on July 1, 1952, and one bird on the main road ten miles east of York.

G.M.S. recorded turtledoves (sp. ?) on December 2, 1952, and January 16, 1953, and E.H.S. recorded several Senegal Turtledoves in January, 1955.

YUNDERUP. Indian: E.H.S. recorded birds, apparently of this species in 1939, but this record requires confirmation.

LOCALITIES FROM WHICH BOTH SPECIES OF DOVES
APPEAR TO BE ABSENT

Albany: Not mentioned by J.W. and not observed by E.H.S. during three weeks' stay in January, 1957.

Augusta: Not recorded in January, 1956, by E.H.S.

Ballidu: Negative record, 1956, from Miss J. Russell. Silo established 1933.

Bilbarin: Not present in 1946 when E.H.S. resided there. Negative reply to Gould League enquiry, 1955. Silo established 1933.

Bridgetown: Not recorded by the late H. M. Whittell who resided in Bridgetown until 1954.

Darkan: Not recorded by B.V.T. who visited the town from time to time during the 1946-1956 period. A brief search of the rail-yards and main streets on July 14, 1954, proved fruitless.

Dumbleyung: Under occasional observation by B.V.T. from 1947 to 1956. Not recorded during a fortnight of R.A.O.U. activity in this centre in September, 1956. Silo established 1937.

Hyden: Occasionally visited by B.V.T. during 1948-1954 period. No records. Silo established 1937.

Kondinin } Under sporadic observation by B.V.T. from 1947
Kukerin } until 1956. No records of turtledoves. Silos were
Kulin } established in each of the centres in 1937.

Lake Grace: Under observation by B.V.T. from 1947 until 1956. Approximately a month was spent there in 1948, from September 9 to 25, 1953, and from August 3 to September 2, 1954. The centre was visited twice during June, 1955, and frequently during August, 1956, and finally during the R.A.O.U. camp in September, 1956. Neither species was observed. Silo established 1937.

Moore River Area: D.L.S. failed to locate turtledoves at the mouth of the Moore River in Oct., 1948, and at the Moore River Gorge, near Mogumber, in Aug., 1950.

Newdegate: Occasionally visited by B.V.T. between 1948 and 1955. No records. Silo established 1937.

Northampton: Not recorded by R.A.O.U. camp party in 1948 (*Emu*, 48: 241). Silo established 1936.

Quindanning: Negative reply to Gould League enquiry, 1955. Confirmed by E.H.S. who visited that centre several times during 1954-55.

Woodanilling: Not recorded by V.F.McD., who visits the place fairly frequently.

Negative replies to the Gould League questionnaire were also received from: Balkuling, Banksiadale, Coonana, Duranillin, Meekatharra, Moulyinning, Naremben, Narrikup, Sandstone, Shannon River, Upper Ferguson, Wandering, Yorkrakine.

Writers of recent papers have not recorded the species at Bunketch (W. Reid), Caron (E.H.S.), Gabbin (L.E.S.), Yoting (G.M.S.).

SUMMARY

(a) The history of the Senegal Turtle dove (*Streptopelia senegalensis*) and Indian Turtle dove (*S. chinensis*) from their introduction in 1898 is briefly traced, with emphasis upon the rapid spread of the Senegal Turtle dove since the mid-thirties.

(b) The nature of the spread of the Senegal Turtle dove is discussed, its relation to the bulk handling of wheat and limitations imposed by food supply, climate or some unknown factor. Present distribution is indicated by maps.

(c) Habitat preferences are discussed.

(d) Hazards to the species are mentioned.

(e) Figures are quoted to show an unexplained uneven relative abundance of the two species in Perth.

(f) Occurrence of both species throughout the built-up areas of Perth is assumed. Details of occurrence and establishment in 106 outside centres are given.

(g) Centres, at which recent observations, reasonably adequate in scope, indicate that both species of turtle dove are absent, are listed.

FROM FIELD AND STUDY

Records of the Pink Sun Orchid (*Thelymitra carnea*).—In the first volume of *Orchids of Australia*, by W. H. Nicholls, this orchid is not mentioned as occurring in Western Australia. However, it is included in Gardner's *Systematic Census*, 1931, and Rica Erickson, in *Orchids of the West*, 1951, states: "All States except Queensland. Rarely collected in W.A." I collected specimens of the species at Jandakot on September 30 and October 2, 1957, and in previous years at Wanneroo.

—A. S. GEORGE, North Lake.

The Range of *Caladenia glossodiphylla*.—This orchid, which was described as a new species in the *W.A. Nat.*, 4, 1953: 65, from specimens collected at Wongan Hills, has apparently quite an extensive geographical range. In early June, 1957, I collected specimens in the Koolanooka Hills, east of Morawa, in a gully among York gums; at Arrino under low scrub; and in the Yongalla Hills, east of Mingenew, where plants were plentiful among York gums and other scrub. On a recent trip to the south-east I found a dead specimen of *C. glossodiphylla* in scrub country 17 miles east of Newdegate. It was readily identifiable because of the distinctive leaf.

—J. R. TONKINSON, Mosman Park.

A Yellow Mutant of the Western Silvereye.—On April 20, 1958, at the camping area at Windy Harbour (east of Pt. D'Entree-est-caux) one of my companions drew my attention to a "yellow bird" moving and feeding with a flock of some 20-30 Western Silvereyes (*Zosterops australasiac*). I followed the flock through the low coastal scrub and was able to watch the bird several times at fairly